Department of Energy
Office of Worker Protection Programs and Hazards Management
Radiological Control Technical Position
RCTP 2000 - 02

Monitoring and Reporting External Exposures of Individuals Monitored at Different Sites in a Year

Issue:

Title 10 Code of Federal Regulations, Part 835 (10 CFR 835), *Occupational Radiation Protection,* establishes occupational radiation protection requirements for Department of Energy (DOE) activities and includes requirements for reporting individual exposures to ionizing radiation. Questions have been raised concerning DOE's position on the acceptability of the practice of allowing an individual to work at different sites, while continuing to wear a dosimeter issued from the individual's resident work site. Typically, this would be the site where the individual spends most of the work year.

Introduction:

The Office of Worker Protection Programs and Hazards Management (EH-52) received a request for a technical position on the requirements of 10 CFR 835.801(a) and (c) for sites or facilities to report radiation exposures to individuals monitored at their site or facility. The specific situation involved a contractor who was managing radiation protection programs at several DOE sites. Occasionally, the contractor allowed individuals to temporarily travel from their resident site to one of the other contractor's sites to perform short-term work activities. The contractor's policy was to allow these individuals to bring and wear their resident site thermoluminescent dosimeter (TLD) while performing these short-term work activities at the other sites. The contractor reported all of the dose as being received at the resident site with no breakdown or separate reporting by the visited sites. The consistency of this practice with 10 CFR 835 requirements was questioned.

Discussion:

Applicable Requirements

10 CFR 835 *(These requirements were published in the November 4, 1998, amendment to 10 CFR 835)*

§ 835.801 Reports to individuals.

(a) Radiation exposure data for individuals monitored in accordance with § 835.402 shall be reported as specified in this section. The information shall include the data required under § 835.702(c). Each notification and report shall be in writing and include (1) the DOE site or facility name; (2) the name of the individual; and (3) the individual's social security number, employee number, or other unique identification number.

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(c) Each DOE- or DOE-contractor-operated site or facility shall, on an annual basis, provide a radiation dose report to each individual monitored during the year at that site or facility in accordance with § 835.402.

DOE O 231.1, Environment, Safety and Health Reporting

5.a.(6) Report annual exposure data in accordance with DOE M 231.1-1, chapter III, paragraphs 2 and 3.

DOE M 231.1-1, Environment, Safety and Health Reporting Manual.

Chapter III, paragraph 3.

Radiological exposure data shall be:

a. Prepared as directed by appendix G of this Manual

Appendix G, paragraph 12.

Whole Body Dose - Enter the appropriate dose equivalent in units of millirem, right justified. Do not include any occupational dose received by the individual during an off-site visit.

Applicable Guidance Documents

DOE-STD-1098-99, Radiological Control Standard

511.8 DOE discourages the practice of taking TLDs off-site.

511.9 Individuals should not wear dosimeters issued by their resident facilities while being monitored by a dosimeter at another facility unless authorized by the radiological control manager or designee.

Technical Position:

Background

As indicated in the DOE Radiological Control Standard, DOE generally discourages the practice of taking dosimeters offsite. However, there is nothing in 10 CFR 835 or other DOE requirements that precludes the practice of allowing an individual to wear his or her resident site

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issued dosimeter while performing work requiring wearing of a dosimeter at another site. For individuals working at several sites, this practice has the advantage of the individual only wearing one dosimeter and the dosimeter only being processed once for the entire monitoring period. As a result, the costs of issuing and processing multiple dosimeters are avoided, and the missed dose from using only one dosimeter and processing it only once during the monitoring period would be much lower than using many dosimeters or multiple processing of one dosimeter. However, adopting this practice means that the dosimeter reading alone does not provide information regarding where the dose was received. This technical position provides an acceptable approach for meeting the reporting requirements in 10 CFR 835.801(a) and (c) that allows for determination of locations where the dose was received. In addition, DOE O 231.1, *Environment, Safety and Health Reporting* and appendix G of DOE M 231.1-1, *Environment, Safety and Health Reporting Manual* require that radiological exposure data do not include any occupational dose received by individuals during off-site visits. Accordingly, measures, such as those discussed in this technical position, may need to be taken to comply with these reporting requirements.

Acceptable Approaches

10 CFR 835.801(a) requires radiation exposure data be provided to individuals monitored in accordance with 10 CFR 835.402 and that this data include the DOE site or facility name. Title 10 CFR 835.801(c) requires that each DOE- or DOE-contractor-operated site or facility provide a radiation dose report to each individual monitored during the year at that site or facility in accordance with 10 CFR 835.402.

Likewise, DOE O 231.1-1 and DOE M 231.1-1 require that reports submitted to DOE for the purpose of monitoring environment, safety, and health performance include exposure received at a site. The reports are not to include any occupational dose received by the individual during an off-site visit.

Guidance from article 511.8 of the DOE Radiological Control Standard, DOE-STD-1098-99, states that DOE discourages the practice of taking TLDs off-site. Article 511.9 then provides guidance on allowing individuals to wear dosimeters issued by their resident facilities while being monitored by a dosimeter at another facility. The intent of this guidance is to address the issue of individuals wearing dosimeters issued by two sites simultaneously and thus "double counting" dose during those periods. There is nothing in this guidance indicating that it is appropriate to allow individuals to work at multiple sites wearing their resident site issued dosimeter without being able to distinguish and report the dose received at each site.

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Commonly, sites meet applicable monitoring and reporting requirements by issuing a dosimeter at each visited site. Alternatively, there are a variety of acceptable methods to meet the reporting requirements for situations of individuals working at different sites during the year where an individual is allowed to wear his or her resident site issued dosimeter (in lieu of being issued a dosimeter at the visited site).

The method selected should have a sound technical basis and be consistent with the external dosimetry technical basis documentation for both sites (i.e., the resident site's and the visited site's). Issues that should be considered include: (1) site specific correction factors; (2) types of radiation fields encountered; (3) variation in background radiation levels; (4) non-occupational dose measured on the dosimeter during transit (i.e., dose from air travel); and (5) the impact of adopting this practice on the DOE Laboratory Accreditation Program for Personnel Dosimetry (DOELAP) accreditation. The Radiation Protection Program (RPP) and the external dosimetry technical basis documentation should also discuss the geographic boundaries of the site where that method will be applied.

Acceptable methods include:

1. Processing the dosimeter at the conclusion of each site visit and reporting the resultant exposure at that site. Under some conditions, this approach may slightly reduce the costs from issuing multiple dosimeters. It will not reduce the missed dose from multiple processing of the dosimeter during the monitoring period. Implementation of this approach would still require that the dosimeter of record be accredited under the DOELAP for the radiation fields at the different sites where monitoring is performed in accordance with 10 CFR 835.402.

2. Issuing self-reading dosimeters as supplemental dosimeters. Exposure from each site could be estimated using a self-reading dosimeter such as an electronic or quartz fiber dosimeter. At the end of the monitoring period the results from the dosimeter of record and the self-reading dosimeter results could be evaluated to determine the dose received at each site. This approach is consistent with that taken in the commercial nuclear industry. Implementation of this approach would also still require that the dosimeter of record be accredited under the DOELAP for the radiation fields at the different sites where monitoring is performed in accordance with 10 CFR 835.402.

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The technical basis for adopting this approach would need to consider if the self-reading dosimeter is appropriate for monitoring dose from the radiation fields at each site. For example, a quartz fiber dosimeter may not be appropriate to use in this approach in mixed photon and neutron fields.

3. Attributing dose only to those sites where the individual was monitored in accordance with 10 CFR 835.402. A single report could be issued by the resident site that includes a breakdown by site of the dose from sites where monitoring was conducted in accordance with 10 CFR 835.402. Doses below the required monitoring threshold that were not monitored in accordance with 10 CFR 835.402 could be assigned to the resident site based on the lack of regulatory requirements to separately monitor the dose at each site.

   An example would be an individual monitored in accordance with 10 CFR 835.402 at their resident site who subsequently performs work at a second site. The work at the second site is conducted with the individual continuing to wear his or her resident site dosimeter. At the second site it had been determined that the individual was not likely to receive a dose exceeding the monitoring threshold during all visits to that site in a year even though the individual was working in areas that administratively required wearing a dosimeter. The determination that the individual did not need to be monitored needed to consider the access allowed the individual at the site given that the individual was wearing a dosimeter. In this example, only the resident site would need to be included in the exposure report. This practice reduces the costs for issuing and processing multiple dosimeters, reduces the missed dose resulting from using and processing many dosimeters, and results in inclusion of low doses, below the monitoring threshold, in dose reports.

Summary:

Individuals should not wear a dosimeter at multiple sites without appropriate administrative controls. If an individual is allowed to wear his or her resident site issued dosimeter at another site (in lieu of being issued a dosimeter at the visited site), acceptable methods to meet the reporting requirements include:

- Processing the dosimeter at the conclusion of each site visit;
- Issuing a self-reading dosimeter and using the results to assess dosimeter of record results by location; and
- Attributing dose only to those sites where the monitoring is performed in accordance with 10 CFR 835.402.

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The method selected should have a sound technical basis and be consistent with external dosimetry technical basis documentation for all affected sites. The RPP and the external dosimetry technical basis documentation should also discuss the geographic boundaries of the site where that method will be applied.

References:

10 CFR 835, *Occupational Radiation Protection*, U.S. Department of Energy, November 4, 1998

DOE-STD-1098-99, *Radiological Control*, U. S. Department of Energy, July 1999

DOE M 231.1-1, *Environment, Safety and Health Reporting Manual*, U.S. Department of Energy, dated 9-30-95, Washington, D.C.

DOE O 231.1, *Environment, Safety and Health Reporting*, U.S. Department of Energy, dated 11-7-96, Washington, D.C.